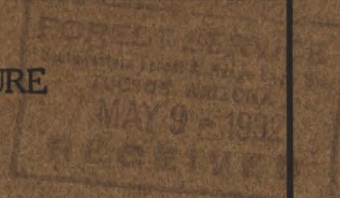


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UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE



R-NW
Investigative Program
1932

Portland, Oregon,

March 22, 1932.

PROJECT SHEETS

ACCOMPANYING ANNUAL REPORT FOR 1931
OF NORTH PACIFIC INVESTIGATIVE COMMITTEE
AND PROGRAM FOR FISCAL YEAR 1933



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PROJECT: Botany (Phenology)

SCOPE: To build up a record from representative stations in the region, of the time that forest and range plants vegetate, bloom, and ripen fruit. This knowledge is useful as an index of the length of the growing season, the fire hazard, the time for cultural operations in logged-off land or in the nursery, the handling of the forage resources, cone collecting, seed crop prediction, and for scientific studies of the relation of biotic events to climate.

STATUS: At 20 stations in the Douglas fir region, some 1500 individual observations were recorded in 1931. These stations are located on each of the west side national forests, at Seattle's Cedar River Nursery, at Portland's West Hills Arboretum, and at Oregon State College's Peavy Arboretum. The plots located in the University of Washington's Pack Forest and one of the plots on the Mt. Hood Forest were not observed this past year. The oldest plots (8 in number) in this study are now 5 years old.

RESULTS OF THE PAST YEAR: One new plot was observed on the Snoqualmie Forest and another was established late in the season for this and coming years. An article was published in Northwest Science for September, 1931, under the title "Phenology an Instrument of Forest Administration". The 1931 field data have been tabulated as in former years, and a progress report is now in preparation.

PLANS, FISCAL YEAR 1933: The study will be expanded to include the plots on the East Side forests that have been observed for the seasonal development of range plants. On these plots or on new areas in eastern Oregon and Washington observations will be made on the more important forest species. The working plan will be revised to fit conditions in the pine region. A number of the stations will be visited during the season to assist the observer in plant identification and new plot locations. Observations will be continued as in past years in the Douglas fir region.

ASSIGNMENT: Kolbe of Experiment Station in cooperation with all national forests, forestry schools, and others.

R-NW
Forestation
Seed

Continued

PROJECT: Forestation - Seed Studies (Formerly Fs-101, Fs-161 and Fs-166)

SCOPE: (a) To test and compare survival and adaptability of ponderosa pine from ten localities covering the entire natural range of the species.

(b) To test and compare the growth and development of pedigreed Douglas fir on various sites and to determine the effect of parentage and origin of seed.

(c) To test different methods of storage of noble fir seed to prolong its life, since under normal storage methods it loses its viability in a single year.

STATUS: (a) Ponderosa pine - Six plantations comprising about 35 acres were established in 1928. They are located on three national forests and on the experimental areas of the forest schools in this region. About half the trees planted died during the establishment period, but the remaining trees are now generally in good health.

(b) Douglas fir - The study was started in 1912 with the collection of seeds from 127 different parent trees growing under various environmental conditions typical of this region. The trees grown from these seeds were outplanted in 1915 and 1916 in six separate plantations.

(c) Noble fir - The first test of holding noble fir seed in cold storage to prolong its life was started in 1921; it was repeated in 1926 storing part of seed with wings attached. The final germination test was made in 1931 and will be checked for second year germination in the early part of 1932; when that is done the final progress report can be prepared.

RESULTS OF THE PAST YEAR: (a) The regional races of ponderosa pine plots were all examined and measured. The Whitman area which has suffered much from rodent damage was treated with poison by workers of the Biological Survey. A progress report was prepared for each plot in which the data are summarized.

(b) The Douglas fir heredity plots were all given their triennial measurement this past fall.

PROJECT: Proper nursery practice for species suitable for planting in the Pacific Northwest region. (Includes former projects Fn-161 Douglas fir and Fn-Secondary Species).

SCOPE: Embraces all phases of nursery technique for Douglas fir, and such modifications in standard practice as may be required for other species which are grown at the Wind River nursery from time to time.

STATUS: Most phases concerning Douglas fir have been satisfactorily worked out and efforts are now confined to the production of a satisfactory grade of seedling stock for planting in place of transplants, and to the working out of practical methods of controlling damping-off. In the first mentioned study, stock is being grown from both low and high altitude seed under various combinations of season of sowing, density of stand and root pruning in place. The development of the trees in the nursery is recorded and relative survival and growth in the field is obtained from test plots installed on various sites. Standard transplants are included on all plots for comparison. Survival counts are made annually for the first three years and periodically thereafter where desirable. To date there has been installed a total of 94 tests of seedlings ranging in density from 40 to 160 per square foot of seedbed and distributed among 31 plots located on a variety of sites on four Forests. Installation of the requisite number of tests of fall sown, low altitude stock is almost completed, a start has been made on field tests with spring sown, low altitude trees, and stock is being grown in the nursery from high altitude seed, both fall and spring sown.

In the study of damping-off control at the Wind River nursery, two series of tests of a large number of chemicals in various strengths and combinations were made in 1929 and 1930 --the first by the Office of Forest Pathology, and the second by the nursery personnel. These indicated that either sulphuric acid 1/4 oz. or aluminum sulphate 3/4 oz. would give effective control. The former was used extensively on all 1931 seedbeds and gave good results on all except fall sown, high altitude Douglas fir beds.

In the study of nursery requirements of species other than Douglas fir, 27 native and exotic species have been under observation from time to time. Of these ponderosa and western white pine, noble fir, Port Orford cedar, western hemlock and red alder have been given most attention. To date 47 trial sowings have been made, of which 30 have completed their nursery cycle and 17 are now under observation embracing 14 different species. The number has been much larger than it otherwise would have been owing to the growing of several species of exotic five needle pine for the Office of Blister Rust Control.

RESULTS OF THE PAST YEAR: (a) Study of Douglas fir 2-0 seedling planting stock. Installed 56 field tests of 40-60-80-100 density classes of spring sown, low altitude seedling stock, distributed among 14 sites on three Forests. These are the first field tests of spring sown, low altitude stock. First year survival within the same classes was more variable than in previous tests and several of the lower density classes showed up as good or better than transplants. Additional lots of seedlings are being grown in the nursery for field tests in 1932 and 1933.

(b) Damping-off control. No new tests initiated in 1931, but detailed study made of the effectiveness of the 1/4 oz. sulphuric acid treatment used as regular treatment. Gave excellent control on all except fall sown, high altitude Douglas fir. Apparently further study needed for this class of seedbeds.

(c) Secondary species. During the year four lots of trees completed their nursery cycle and four new sowings were made. Of the various species experimented with, western hemlock and red alder apparently require the greatest departure from standard nursery technique.

PLANS FOR F. Y. 1933: (a) Douglas fir seedling stock now being grown in the nursery will be planted out and new lots for 1934 planting will be started. These will probably complete the number of tests needed.

(b) If damping-off losses continue in the 1932 fall sown, high altitude Douglas fir beds, additional tests will be installed in the fall to perfect the treatment for this class of beds.

(c) The various lots of secondary species still present in the nursery will be continued under observation and perhaps one or two additional trial sowings will be made. A large number will be completed.

ASSIGNMENT: Will at the nursery and local Forest officers under direction of Kummel.

RS
Forestation
Fp-Planting

Continued

PROJECT: Field planting and seeding. (Includes former projects Fp-161 Douglas fir and Fp-Secondary species).

SCOPE: Determination of the proper planting and seeding technique for native species under various site conditions prevailing on planting areas, and of measures likely to aid in the protection of plantations. Species involved are chiefly Douglas fir, ponderosa pine, noble fir and red alder. Includes the following phases now under investigation:

1. Proper Density for Douglas Fir Plantations

STATUS: Plots established on the Columbia in 1925 illustrating various densities of spacing ranging from 4x4 to 12x12. Survival counts made frequently, fall spots replanted, and heights measured at end of 5th year.

RESULTS OF THE PAST YEAR: No examination made.

PLANS F. Y. 1933: Nothing scheduled.

ASSIGNMENT: Isaac of the Experiment Station.

2. Effect of Aspect and Brush Cover on Survival

STATUS: Douglas fir plots established on the Rainier and Columbia Forests in 1925, 1927, 1928, and 1930, and ponderosa plots on the Crater in 1929, and on the Umpqua in 1930 and 1931. Examinations made at frequent intervals.

RESULTS OF PAST YEAR: Three sets of the Douglas fir plots were examined in 1931. In the matter of aspect it appears that though initial mortality was considerably greater on southerly than on northerly slopes during the first three years, subsequent losses are not greatly different. On brushy areas initial mortality continues during a longer period after planting than in the open, presumably because of brush competition and greater animal cropping.

Among the ponderosa pine plots, the third year examination of those on the Crater indicates that mortality continues to be heavier in the open than under moderate overhead shade from reserve trees. On the new Umpqua plots first year survival was better in the open than in ceanothus brush.

PLANS FOR 1933: Continue observations of present plots.

ASSIGNMENT: Local Forest officers under supervision of Kummel.

3. Direct Seeding in the Fog Belt with Small Seeded Species

SCOPE: Includes broadcast seeding tests on cut-over lands in the spruce-hemlock type, using Sitka spruce, western hemlock, western red cedar, Douglas fir, and red alder; these species because of the large number of seed per pound (200,000 to 1,000,000) are felt to offer possibilities.

STATUS: First seeding done in January 1929 using spruce, hemlock and cedar has been repeated each year since, and in January 1932 Douglas fir and alder were added. Annual seedling checks have been made and a progress report prepared in 1931.

RESULTS OF PAST YEAR: The 1929 and 1930 seeding averages 800 to 1000 seedlings to the acre and 1931 seeding showed good germination in June.

PLANS FISCAL YEAR 1933: Periodic seedling checks and a duplication of the tests of past years.

ASSIGNMENT: Isaac of Experiment Station with assistance from Olympic Forest.

4. Sites Suitable for Noble and Silver Fir

SCOPE: Includes test plantations on a number of sites of various aspects and density of brush cover on the Rainier and Mt. Hood Forests.

STATUS: Plots installed in 1925, 1927, and 1929 and examined periodically since.

RESULTS PAST YEAR: Two sets of noble fir plots examined. Results confirm previous indications that while survival of noble fir is not greatly different from Douglas fir on cool northerly aspects, it is markedly lower on dryer southerly slopes. Initial mortality also continues for a somewhat longer period than Douglas fir.

PLANS FOR F. Y. 1933: Only such examinations as may be necessary.

ASSIGNMENT: Kummel with assistance of local Forest officers.

5. Season of Planting

SCOPE: Has included both Douglas fir and ponderosa pine, but latter only species now current.

STATUS: Companion plots of fall and spring planting established on the Crater Forest 1925-1926 and on the Umpqua in 1930-1931. Examined periodically.

RESULTS PAST YEAR: On the Umpqua plots first year survival average 14% higher in the spring planting than in the fall plots. This is in line with similar results obtained previously on the Crater plots.

PLANS FOR F. Y. 1933: Continued observation of present plots.

ASSIGNMENT: Kummel with assistance of local Forest officers.

6. Animal Cropping in Plantations

SCOPE: Determination of the amount, duration and ultimate effect of animal cropping in Douglas fir and ponderosa pine plantations.

STATUS: Several plots of staked and numbered trees located in extensive plantations on the Olympic, Rainier, and Umpqua Forests are under periodic observation.

RESULTS PAST YEAR: Current examinations of Douglas fir plots indicate that prevalence of cropping decreases rapidly after the first two or three years and that while height growth may be retarded at least temporarily, actual mortality is not excessive. In ponderosa pine plantations initial mortality appears to be more serious.

PLANS FOR F. Y. 1933: Continued examination of present plots.

ASSIGNMENT: Kummel with assistance of local Forest officers.

7. Alder Fire Breaks

SCOPE: Determination of the suitability of red alder for the formation of fire breaks on cut-over and other snag free areas.

STATUS: One and one-half miles of strip planted along an old logging grade on the Olympic Forest in 1928. Additional small plantings in 1931 to test the adaptability of the species to less moist locations.

RESULTS IN THE PAST YEAR: No examination made.

PLANS FOR F. Y. 1933: If nursery output comes up to expectations, a considerable number of additional strips will be established on various sale areas.

ASSIGNMENT: Kummel with assistance of local Forest officers.

RS
Forestation
Exotics

Continued

PROJECT: Adaptability of exotic species to the Pacific Northwest region.

SCOPE: An arboretum at WindRiver branch station to test the adaptability of exotic species and to compare different races within the same species; also demonstration plots of the more promising exotic species under forest conditions in various parts of the region, and of local species beyond their natural range.

STATUS: The arboretum now contains over 1000 trees of 132 different species and races, mostly coniferous. All are labeled and catalogued as to origin and parentage. Many have already reached the seed bearing age. A considerable number of additional trees are being grown in the arboretum nursery.

Demonstration plots under forest conditions have included both coniferous and hardwood species and have been located quite widely throughout the region. Most of the hardwood plantations have been failures and are no longer under observation. Various coniferous species have done better but none give promise of being superior to native trees. Port Orford in the coast region north of its natural range has done fairly well thus far, redwood has suffered from frost except at sea level near the coast, bigtree has shown both good and poor survival in various plots.

RESULTS OF THE PAST YEAR: In the arboretum 250 trees of 18 species were set in their permanent location, and 27 lots of seed or trees were acquired for propagation in the arboretum nursery. Material assistance was given other arboreta including the distribution to cooperators and correspondents on four continents of over 175 packets of native seed.

One new demonstration plot of Bigtree was established on the Columbia Forest and several of other species examined for survival and growth.

PLANS FOR F. Y. 1933: A considerable number of trees will be added to the arboretum from the nursery and efforts will be continued to obtain seed or trees of species not now represented. A report which is now in preparation will be completed giving the results of planting various exotics in this locality.

Several of the demonstration plots of exotic species will be examined and two new plots installed.

ASSIGNMENT: Arboretum. Munger and Kolbe of the Experiment Station.

Demonstration plots on Forests - Kummel with the assistance of local Forest officers.

R-NW

M

Douglas Fir

Management of Douglas Fir

Continued

Old designation: Mb-161 and Mr-161.

PROJECT: Management - Douglas fir.

SCOPE: A study of various factors from which to develop fundamental principles of silvicultural practice for the Douglas fir region. It now includes:

- (a) Physical and biological factors that govern regeneration.
- (b) Germination and survival on 300 semi-permanent plots.
- (c) Production and dissemination of seed.
- (d) Life of seed after falling; germination tests of soil stored seed.
- (e) Survival and effectiveness of seed trees.
- (f) Sheep grazing and natural reproduction on cutovers.
- (g) Douglas fir slash disposal; includes periodic measurement of 58 plots burned and unburned, complete fire history of 21 slash areas, correlation of other information such as rate of decay, and rate of restocking, and development of a technic for slash burning.

STATUS: (a) Detailed observations of physical and biological factors have been under way on cutover and timbered areas in Wind River Valley since 1927. Observations taken daily or weekly include individual seedling records along with temperature, evaporation, rainfall, soil moisture and cover on different exposures. Results to date are summarized in the first progress report just completed.

(b) Germination and survival on 24 groups of sample plots on both private and government land, has been checked frequently for a period from one to five years. Field data to date have been posted in the file records.

An unmatched period of drouth has persisted for the life of the study and the best seed crop to occur was a medium in 1930. To round out the information both a normal rainfall and heavy seed crop are necessary but since both are uncertain, the results to date will be summarized before the end of the present fiscal year.

(c) A hiatus occurred in the seed production and dissemination because of the seed crop failure and the destruction of seed traps by a slash fire.

(d) The life of seed stored in the soil is now being tested for the third time. The first test was made with 1925 seed, the second with 1928, and third with 1930. The third year germination test of 1928 seed and first year germination test of 1930 seed was made in 1931.

(e) Single seed tree plots on Snoqualmie, Mt. Baker, Mt. Hood Cascade, and Santiam Forests had fifth year results summarized in 1930, and made annual examinations in 1931. Plot on the Olympic testing single tree and group systems together was destroyed by fire in 1931 and the Mt. Hood established a similar plot to test both systems during the past year.

(f) Grazing and natural reproduction study had plant succession phase summarized by D. C. Ingram in 1929 (published J. L. R. 9/1/31) and the reproduction phase was summarized at the same time. Seedling and cover checks before and after grazing have been made through 1931.

(g) In the Douglas fir slash disposal study slash on 58 sample plots has been measured from one to three times; historical data collected on 21 slash areas; information gathered on other phases, such as rate of decay and rate of restocking; technic of burning studied. All computations are up to date. No field work in 1931.

RESULTS OF THE PAST YEAR: (a) In the physical factors study drouth caused all seedling losses in 1931 and constitutes the fourth new primary cause of seedling loss to present itself in as many successive years; south exposure showed itself to be much more severe than others, and early seedling growth was found less than expected.

(b) A general summary of germination and survival on different sites shows two thirds of areas revisited by fire and less than one third restocked in five year period.

(c) Seed production and dissemination - disrupted by slash fire and no seed.

(d) Tests of 1925 and 1928 soil stored seed check showing little or no germination after the first year. The 1930 seed showed normal germination in beds in 1931, but also showed vigorous germination in containers, under the timber, and in the open.

(e) Current examinations were made of seed tree plots and showed unusually heavy losses resulting from terrific wind of April 1931.

(f) Grazing and natural reproduction study shows sod formation where over grazing occurred and no reduction of cover on bracken fern areas. It remains to be determined if these developments are offset by reduction of fire hazard and brush and weed competition.

(g) Douglas fir slash disposal computations were brought up to date.

PLANS FOR FISCAL YEAR 1933: (a) Results of first five years study of physical factors and natural reproduction should be published, periodic measurements continued on Wind River Area and check data obtained from other parts of region.

(b) Examinations of germination and survival plots should be continued, an additional group located in the fog belt, and a new group located in Douglas fir region along with seed traps to give measure of seed fall.

(c) Seed dissemination combined with (b) as stated above and the production phase extended to measure seed fall by means of traps under mature (natural area) and young growth stands near Wind River Branch Station.

(d) Test of the 1932 germination will be made. If no germination occurs the results of the 1925, 1928, and 1930 tests can be summarized and published.

(e) Seed tree plots will receive current examinations. A field study should be made to correlate the single seed tree and group system with the growing practice of leaving timber blocks for seed supply and fire protection and also with economic selection cutting.

(f) Regular examinations before and after grazing and prepare reproduction summary to date.

(g) Douglas fir slash disposal --all of the permanent plots are to be revisited and at least 25 more "case histories" should be obtained by contact with local fire wardens and others. Practical test of some of the ideas thus far developed should be made; this probably can be done on one of the national forests of the Douglas fir region as well as on one or two typical areas of privately-owned slash. A progress report will be written in the fall of 1932.

ASSIGNMENT: Studies (a) to (f) to Isaac of the Experiment Station with some assistance from national forest personnel on the minor study sub-assignments, (g) to McArdle and Matthews of the Experiment Station.

R-NW

M

Ponderosa Pine

Continued

PROJECT: Management - Ponderosa Pine (Formerly Mc-101)

SCOPE: To determine the effect of different methods of cutting on (1) advanced reproduction, (2) establishment of subsequent reproduction, (3) growth and mortality in the reserved trees, and (4) upon the financial aspects of timber management.

To determine the effect of slash on the growth and survival of reproduction and on fire hazard.

STATUS: The total number of plots is now 21, with an area of 278 acres. They range from 5 to 50 acres in size and are located on four national forests in eastern Oregon. Nine of plots in two groups still remain to be cut. The data that have been taken for each tree before and after logging on most of the plots make possible further analysis in combination with the findings of the two mill scale studies and of growth and yield investigations. Such an analysis should show which method of cutting will give the greatest volume, quality, and value return over a period of years. All plots are examined at least once each year; those on which more intensive reproduction studies are carried on are gone over two or three times during the growing season.

RESULTS OF THE PAST YEAR: All the plots were examined once or twice during the year. Plot 7 on the Deschutes Forest was given its 5-year periodic remeasurement. For five plots the data have been summarized in progress reports. Completed results indicate that larger plots are needed to give reliable data on growth and mortality in the stand for various methods of cutting. The results of the two mill scale studies in this region as applied to data for various periods on several plots is now being compiled in a report.

PLANS FOR FISCAL YEAR 1933: The working plan for this project will be revised to include methods for the establishment of plots considerably larger in extent than at present. Plot areas will be selected on the Pringle Falls Experimental Forest and at other suitable places in conjunction with the Bureau of Entomology. The four uncut plots on the Deschutes Forest that will have been established for a 5-year period in the fall will be remeasured. Four plots on the Crater Forest that have been cut five years ago will be given their half-decade examination. The 4 plots on which the slash was left will be examined in cooperation with the Bureau of Pathology. All the other plots will be given their annual examination.

ASSIGNMENT: Kolbe of Experiment Station, in cooperation with Forest Management, National Forests, the Bureau of Entomology, and the Bureau of Pathology.

R-NW
Mt
Douglas Fir

Continued

Old designation: Mt-161

PROJECT: Management - Thinning Douglas fir.

SCOPE: To determine the proper spacing of Douglas fir trees for best volume and quality production, the best type of thinning to make for each age class, and the economic and silvicultural aspects of thinning.

STATUS: The Experiment Station maintains three plots at Wind River in a stand which was approximately 20 years old at the date of the last remeasurement. As a subassignment, three national forests, the Siuslaw, the Cascade, and the Olympic, maintain from 2 to 4 plots each, and are held responsible for all current activities and remeasurements upon them. The Station has also furnished cooperation in the establishment of thinning plots by other agencies, such as Oregon State College.

RESULTS OF THE PAST YEAR: None of the plots were remeasured last year, but during the year an article in the Journal of Agricultural Research appeared titled "Thinning Experiments in Young Douglas Fir", based upon first three measurements of the Wind River plots.

PLANS, FISCAL YEAR 1933: The Siuslaw plots and the Cascade plots will be remeasured in the spring of 1932. No work for F. Y. 1933. This project is continuous throughout the life of the stands.

ASSIGNMENT: Keyer of Experiment Station with subassignments to the Siuslaw, Cascade and Olympic National Forests.

R-NW
Mt
Ponderosa Pine

Continued

Old designation: Mt-101

PROJECT: Management - Thinning Ponderosa Pine.

SCOPE: To determine the effect of thinning sapling ponderosa pine as a relief from overcrowding and stagnation.

STATUS: This project is carried on by several national forests in eastern Oregon and Washington under the general supervision of the Experiment Station. During the past 5 years, 2 to 4 plots have been established upon each of the following forests: Fremont, Umatilla, Whitman, Malheur, and Ochoco. The plots are remeasured every 5 years.

RESULTS OF THE PAST YEAR: Two new plots are being established on the Ochoco National Forest to supplement the two already established. Due to the young age of the plots, no significant results have as yet been reached.

PLANS, FISCAL YEAR 1933: Further establishment of plots in favorable localities. Tests of cheap broadcast thinning of stagnated reproduction will be made on the Whitman. The Fremont plots should be remeasured in the fall of 1932. The Umatilla plots 1 and 1a should be remeasured in the spring of 1933. No significant reports on this study are expected until at least three measurements have been made.

ASSIGNMENT: Meyer and Kolbe of the Experiment Station with sub-assignments to the Fremont, Umatilla, Whitman, and Ochoco National Forests.

R-NW
ME
Douglas Fir

Continued

Old designation: ME-161
ME-Volume (part)

PROJECT: Mensuration - Douglas fir.

SCOPE: To collect and prepare forest mensurational data which will contribute to the knowledge of the growth and yields of the Douglas fir type and the volume and form of the component species.

STATUS: Thirty-six plots are being remeasured at 5-year intervals in second growth Douglas fir stands of varying density to furnish a check upon the trends of yield as stated in the normal yield tables and to give information upon the individual development of trees of varying diameter, dominance and spacing. Supplementing this series are 10 plots established to determine the effects of thinning.

Interregional volume tables and necessary regional volume tables for the several species occurring in Douglas fir type should be prepared when sufficient data are gathered and when a need for such tables develops. This has been done with mature Douglas fir for which interregional tables based on 7000 trees are now nearly completed. Other contemplated species are the balsam firs, western hemlock, Sitka spruce, western white pine, western larch, western red cedar, etc.

RESULTS OF THE PAST YEAR: Seven plots were remeasured on the Siuslaw National Forest and 4 on the Olympic National Forest. The measurements have been worked up and combined with previous measurements, giving on several plots the trends of 20 years growth.

Progress reports were prepared on the fifth measurement of the Cascade plots and on the first measurement of the Mt. Hood plots.

Over 7000 analyses of mature Douglas fir taken in all parts of its commercial range, including Regions 1, 3, 4, 5 and 6, were worked up for cubic and board foot volume, and the data combined into a set of tables which will serve as a standard for comparison of growth and volume values of mature stands throughout the entire range. This set consists of 12 tables, giving, under several site conditions, the cubic and board foot volumes by total height as well as merchantable height classes.

PLANS, FISCAL YEAR 1933: Ten plots must be remeasured on the Rainier National Forest. The measurements taken upon the older plots of the Siuslaw, Columbia, and Cascade National Forests will be analyzed in their entirety, and a report will be prepared supplementary to the one which appeared in 1928 under the title "Rates of Growth of Immature Douglas Fir as Shown by Periodic Remeasurements on Permanent Sample Plots". Plans are being made to establish more plots if suitable areas can be found.

ASSIGNMENT: Meyer of Experiment Station.

R-NV

ME

Ponderosa Pine

Continued

Old designation: ME-101

ME-Volume (part)

PROJECT: Mensuration - Ponderosa Pine

SCOPE: To collect and prepare forest mensurational data which will contribute to the knowledge of the growth and yields of the ponderosa pine type and the volume and form of the component species.

STATUS: No extensive field work was carried on during the past year on this project as has been the case for the three previous years, but all the effort was concentrated upon the analysis of the data. These data consist of 179 plots in old partially cut stands taking into account over 5000 trees of many degrees of development, age and dominance; strip surveys in 15 extensive stands; detailed stem analyses of 179 trees; age counts of over 700 seedlings; 80 plots in even-aged, fully stocked stands.

RESULTS OF THE PAST YEAR: Pending the preparation of the final manuscript, a series of 12 office reports was prepared on various phases of the study, giving in detail the methods and results of certain developments which can not be treated fully in the final report. The following list of titles indicates the scope of these preliminary reports:

1. Basic data for the growth and yield study in western yellow pine.
 2. Cubic foot volume of small-sized western yellow pine.
 3. First report on the Wanoga Butte permanent sample plots in even-aged western yellow pine.
 4. Seedling growth of western yellow pine.
 5. Effect of release upon height growth and upon the shape of the height curve.
 6. Mortality in selectively cut stands of western yellow pine.
 7. Volume check of cubic foot volume table for western yellow pine on medium and good Site IV.
 8. Bark thickness and bark volume of western yellow pine.
 9. Relation of volume growth to tree class in western yellow pine.
 10. Effect of release upon the form and volume of western yellow pine. (Published in Journal of Forestry, December, 1931)
 11. Effect of dry cycles upon forests and some forest uses.
 12. Preliminary alignment charts for determining growth in selectively cut stands of western yellow pine.
- Forest Research Notes No. 6.

At the present time the growth charts are being examined thoroughly and correction factors are being determined for the effect of structure and release upon volume growth. By means of these charts it will be possible to predict the growth in a selectively cut stand with any size reserve for any period up to 60 years after cutting upon Sites III, IV, and V.

Work upon the yield tables for even-aged, fully stocked stands of ponderosa pine is being temporarily held up, in anticipation that this study might be expanded to cover the entire commercial range of this species. If this expansion can be arranged with the other Experiment Stations for the summer of 1932 no further work will be done in the Oregon and Washington measurements until sufficient data are gathered from all the regions. Otherwise the plots taken in Oregon, Washington, and northern Idaho should be the basis for a set of normal yield tables for even-aged stands.

Investigation has started upon the growth of the individual tree in a selection stand in an attempt to determine the best kind of tree to leave, the most desirable spacing, and the relative values of several methods of cutting. Since ponderosa pine grows on a so-called "sensitive site", it is ideally adapted to a study of climatic cycles. Data collected on 24 widely separated areas is therefore being analyzed in an attempt to define the significance of the present dry cycle and the average duration of such cycles.

PLANS, FISCAL YEAR 1933: Completion of the final report on the yields of selectively cut stands. Application of the results to extensive areas and to cut-over surveys. Expansion of the study of even-aged stands to the rest of the range of ponderosa pine. Establishment of permanent sample plots in even-aged stands to supplement the data which will be gathered on the three plots on Wanoga Butte in the Deschutes National Forest.

ASSIGNMENT: Meyer of the Experiment Station.

R-NW

ME

Spruce - hemlock.

Continued

Old designation: ME-Volume (part)

PROJECT: Mensuration - spruce-hemlock.

SCOPE: To collect and prepare mensurational data which will contribute to the knowledge of the growth and yields of the spruce-hemlock type and the volume and form of the component species.

STATUS: Two permanent plots are remeasured at 5-year intervals. Numerous stem analyses of western hemlock, Sitka spruce, and western red cedar are at hand for a standard set of volume tables which should be prepared before a growth and yield study of this type is far under way.

RESULTS OF THE PAST YEAR: No activity beyond the collection of existing data upon the volume of the several species.

PLANS, FISCAL YEAR 1933: The working plan will be prepared for a study of the growth and yields of even-aged stands in the spruce-hemlock type. The general field will be gone over to select the study areas. The requisite volume tables will be drawn up. Other preliminary arrangements will be made so that the field work will be in full swing during the summer of 1933.

ASSIGNMENT: Meyer of Experiment Station.

(Formerly Pf D-1, Analyses of the time factors
in fire control with new phase added)

PROJECT: Fire Studies - Attack.

SCOPE: (a) Analyses of time factors in fire control - By analyses of the information listed on fire reports to determine the speed-of-attack necessary in each major forest cover type to hold the burned acreage to previously defined objectives. The information has immediate application in planning the location of forest roads and trails and in the placement of fire suppression forces.

(b) Visibility range of lookouts - To determine the maximum effective distance at which lookouts can see the smoke of small fires under average summer visibility conditions.

STATUS: (a) Analyses of time factors - Analyses have been completed for each of 22 national forests; in addition similar and augmented analyses are being made for various groups of these forests and analyses for 2 such groups have been completed. Nearly 13,000 fires are being studied. Nearly 1,500 charts have been prepared to illustrate the findings of this investigation. The information obtained has already been used in planning more effective fire suppression for the national forests. The study is to be dropped when a report has been prepared for publication. This study was begun in November 1930 at the request of the Regional Forester.

(b) Visibility range of lookouts - This study was begun in the summer of 1931 at the request of the Regional Forester. Assistance was given in supervision of studies on 4 national forests. Intensive work also was done on the Deschutes National Forest, and the Experiment Station will analyze all data. The study is to be continued.

RESULTS OF THE PAST YEAR: (a) Analyses of time factors - In the past calendar year the analyses were completed for the eastern Oregon and Washington forests, and in the current fiscal year analyses have been made for 12 western Oregon and Washington national forests, over 300 charts have been prepared to illustrate the results obtained, and a report written describing the results obtained for each forest. More than 6,000 fires were involved. Work is now in progress on similar analyses for various groups of these 12 forests and it is expected that this project can be completed by July 1, 1932. The time required to discover the existence of fires has been found to consume about 90 per cent of the total time between origin of fire and arrival of the first suppression forces, indicating a need for better systems of fire detection. A few large fires (4 per cent of the total number of fires) were found to be responsible for 97 per cent of the total burned acreage and three quarters of all the money spent on

fire suppression. All large fires were analyzed individually to ascertain why they became large. Tables were prepared to show the "load factors" for each forest cover type, indicating the chances of fires starting and the probabilities of these fires becoming large. Definite standards for each of the various time factors were established, and with these as a basis the plans for deployment of the fire suppressive forces on each forest are now being thoroughly revised. These analyses have indicated where road construction is vitally needed and where construction, for the present at least, may safely be postponed. This information is resulting in actual savings of many thousands of dollars. All of the information thus far obtained has been put to immediate use.

(b) Visibility range of lookouts - On the Deschutes National Forest nearly 300 tests were made of range of lookout visibility. These tests were made using known quantities of smoke produced artificially and under various atmospheric conditions. It was found that the smoke of small fires, although clearly visible for 20 or 25 miles in clear weather, can not be seen at distances greater than 5 or 6 miles under average summer conditions of haze or smoke. This information is revolutionizing the placement of lookouts. A report on these tests is now in preparation. Similar tests on 4 national forests were made by forest personnel and these results will be analyzed by the Experiment Station. On several forests additional tests of visibility were made by recording the degree of visibility of natural targets at intervals of one hour. These data also were turned over to the Experiment Station for analysis.

PLANS FOR FISCAL YEAR 1933: (a) Analyses of time factors - Study to be closed.

(b) Visibility range of lookouts - The smoke tests are to be continued to obtain more information with smoky or hazy atmospheric conditions.

ASSIGNMENT: (a) Analysis of time factors - Closed.

(b) Visibility range of lookouts - R. E. McArdle and D. N. Matthews.

(Formerly Pf B-1 Reporting and charting lightning storms.

Pf B-5 Fire behavior of large fires and measurement
of seasonal fire hazard (weather-fuel-relationships)

Pf C-7 Static and lightning storms)

PROJECT: Fire Studies - Behavior

SCOPE: (a) Reporting lightning storms - To observe and report the occurrence and movement of lightning storms on the national forests; to define zones of lightning storm frequency; to determine if there are consistent and recognizable differences in the behavior and aspects of individual storms; to learn if there are normal paths of storm movement; and to provide the Weather Bureau with accurate information so that lightning storm forecasts may be made most accurate.

(b) Static and lightning storms - To study the relation of static, as indicated through radio receiving apparatus, to fire weather. Particularly to study its possibilities as an aid in the prediction of thunderstorm occurrence and location.

(c) Fire behavior - To obtain the information which will result in a more thorough understanding of the way that various combinations of weather, fuel, topography, etc., influence the spread of forest fires.

(d) Measurement of seasonal fire hazard - To develop methods for measuring the accumulated effect of all weather elements on fuel inflammability.

STATUS: (a) Reporting lightning storms - This study has been in progress since 1924. The records for the period 1925 to 1931, inclusive, have been analyzed since the last report, and a progress report is being written. The study is to be continued.

(b) Static and lightning storms - All records taken in the period 1925 to 1931, inclusive, have been analyzed and a report written. The study is to be dropped as a major project but continued in cooperation with the Physics Department of Reed College.

(c) Fire Behavior - This study was begun in the summer of 1926. A new technic for the study was developed and was used in 1929 and 1930 with complete success. Detailed studies have now been made of the spread of 18 large fires. The study is to be continued.

(d) Measurement of seasonal fire hazard - This study has been in progress since 1924. Measurements have been made at 10-day intervals during the growing season of the moisture content of various forest materials. The effect of changes in relative humidity on fuel moisture content has been determined for 21 of the more common forest fuels. The amount of rainfall intercepted by various types of forest cover has been studied. The use of wood cylinders

to measure the accumulated effect of various weather elements on fuel moisture content was investigated. The study is to be continued.

RESULTS OF THE PAST YEAR: (a) Reporting lightning storms - The occurrence and movement of each of several thousand storms has been plotted on daily maps, yearly summary maps compiled, and zones of lightning storm frequency outlined. Similar maps for lightning fires also were prepared. One significant result of the study is the discovery that more than two thirds of all lightning fires occur on a very few days, when storms are of widespread, general occurrence. The Weather Bureau intends to use these maps of storm occurrence to study the weather conditions resulting in lightning storms. A report is being prepared for publication.

(b) Static and lightning storms - Eight small static "meters" were operated on the national forests last summer and supplemental work was done at the Pringle Falls station. All of the records taken in the period 1925 to 1931 inclusive were thoroughly analyzed. These analyses showed that all of the static indicating devices were registering the effects of distant thunderstorms and that no warning of local thunderstorm occurrence could be obtained through their use. A report describing these analyses and the results obtained was written for the files. Arrangements were made to continue the study by co-operating with the Physics Department at Reed College.

(c) Fire behavior - No work was done on this phase of the project last summer.

(d) Measurement of seasonal fire hazard - Intensive studies were made of the possibilities for using the accumulated moisture content of wood cylinders of various sizes as indices of fuel inflammability. This method, which at first appeared most promising, can not be recommended until further work has been done under controlled conditions to develop a technic for avoiding the inclusion of unnatural conditions. The field work thus far done has been brought up to date in analyses.

PLANS FOR FISCAL YEAR 1933: (a) Reporting lightning storms - Continue as in the past. After the Weather Bureau has analyzed the lightning storm maps, it may be necessary to make some changes in the existing procedure or to ask for additional observations of storm movement or weather conditions.

(b) Static and lightning storms - Cooperate with Reed College.

(c) Fire behavior - Visit as many large going fires as possible and round out the data already obtained. Write a progress report.

(d) Measurement of seasonal fire hazard - Determine the best materials to use as representative of forest fuels for measurement of moisture content and inflammability and develop a technic for avoiding difficulties encountered in previous work.

ASSIGNMENT: (a), (b), (c), and (d) - R. E. McArdle and D. N. Matthews.

(Formerly Pf A-1 Fire Damage)

PROJECT: Fire Studies - Damage.

SCOPE: The purpose of this study is to obtain by study of the kind and amount of damage ordinarily caused by forest fires, the basic information which will make possible the rating of fire hazard on different types of forest areas and will enable more accurate measurement to be made of the effects of forest fires. This information is urgently needed for the fire depletion phase of the national forest survey; it has immediate application to the contemporary study of the possibilities for forest fire insurance; it is needed to provide a more reliable basis for fire control objectives, and in this way will directly influence the expenditures for forest roads and trails.

STATUS: This project was placed in the Investigative Program for 1931, but due to lack of personnel no work was done, although certain of the work done on the insurance study relates closely to this project.

RESULTS OF THE PAST YEAR: See above.

PLANS FOR FISCAL YEAR 1933: It will be necessary to develop a technic for this study. As a preliminary measure a survey will be made of a number of large fires which have occurred within the past two years. In so far as can be foreseen at this time, the study should aim to determine the effect of forest fires on (1) soil fertility and site quality, (2) timber volume and quality, (3) the creation of future fire hazards, (4) the effect of fire in promoting or retarding the restocking of the area with forest trees, and (5) the effect on erosion and water-holding capacity of the area.

The first work done may be aimed to tie in with the fire depletion phase of the forest survey.

ASSIGNMENT: R. E. McArdle and D. N. Matthews.

PROJECT: Economics - Forest Survey of Oregon and Washington.

SCOPE: Under the authority of the McSweeney-McNary Act to make a comprehensive survey of the present and prospective requirements for timber and other forest products, and of timber supplies, including a determination of the present and potential productivity of forest land therein, and of such other facts as may be necessary in the determination of ways and means to balance the timber budget of the United States.

STATUS: (March 1, 1932) Douglas Fir Region Only.

Inventory Phase - Field work done on 11,850,000 acres National Forest. Field work yet to be done on National Forests as follows:

Siuslaw	299,000 acres
Mt. Baker	92,000 "
Olympic	391,000 "

Office work from 70 to 90 per cent completed on all forests but these three. Mapping in place completed for 10,900,000 acres of lands other than National Forests (19 counties). Mapping in place in progress in 8 counties. Mapping in place yet to be started in 11 counties representing 7,711,000 acres (this does not include the undone acreages in counties in which work is now in progress). Fifty-eight thousand acres of check cruising completed; this represents 17 counties done. Check cruising in progress in 3 counties. Check cruising yet to be done in 18 counties.

Depletion Phase - Basic principles agreed on and tentative working plan set up. Forms drawn up and initial work started in cutting and fire depletion on National Forests.

Growth Phase - Working plan written and accepted by Washington Office.

Requirements Phase - Nothing done to date except discuss plans and methods.

RESULTS OF THE PAST YEAR: (March '31 to March '32) All in Douglas fir region. Strip survey of Lewis County completed. Comparisons made with compilation method for same area and changes in compilation procedure initiated. Mapping in place finished in 7 counties and check cruising finished in 8 counties. Working plan for compilation of inventory data completed and inventory data for Columbia Release Unit worked up. Growth phase working plan written. Preliminary memoranda and tentative working plans for depletion phase set up.

PLANS FOR FISCAL YEAR 1933: For the Douglas fir region: Plan to complete inventory phase, including both field work and office compilations, if temporary personnel situation allows. This includes both work on national forests and lands other than national forests, and also includes the work of checking the national forest inventory data. Plan to finish both field and office work on depletion phase with cooperation by Section of Products. Should be able to finish growth phase with Meyer's cooperation in the spring of 1933. Work on requirements phase to be prosecuted by Section of Products.

For the ponderosa pine region: Field work on inventory phase to be begun in small way late in 1932 and continued in spring of 1933 on national forest and private land.

<u>ASSIGNMENT:</u>	Andrews, in charge	Briegleb
	Cowlin	Kemp
	Kline	Moravets
	Pratt	Kirkpatrick
	Wakeman	Meyer
	Girard	Lodewick
	Bolles	Johnson
	Buell	Rapraeger

RE-NW

Extensive Revision of Forest Statistics

Closed

PROJECT: Economics - Revision of Forest Statistics.

SCOPE: This project was initiated nation-wide since the last investigative Committee meeting, and therefore not on the 1931 program. It consists in a bringing together of all the best estimates of existing timber supplies, acreages of forest types, rates of depletion from various causes, and of rates of growth. This was a revision of the statistics prepared nearly a decade ago for the Capper Report.

STATUS: The project was assigned as a joint undertaking of the Regional Forester's Office and the Experiment Station and of co-operating specialists in the Bureaus of Entomology and Plant Industry. The Experiment Station handled the growth and depletion from cutting phase; the Regional Forester's Office the inventory phase, and the depletion from fire phase; Mr. Yeon, the insect depletion phase; and Mr. Childs the depletion from disease and wind phase. All required work was completed in early summer. An interregional conference was held on the growth phase in early fall and some revision made thereafter.

RESULTS OF THE PAST YEAR: See above.

PLANS FOR FISCAL YEAR 1933: Closed.

ASSIGNMENT: None.

RE-NW

New Public Domain

New

PROJECT: Economics - New Public Domain.

SCOPE: A survey of the amount of tax delinquent forest lands in Oregon and Washington, of the trends in delinquency and abandonment, by ownerships, geographic location, and character of land. A study of the causes for such abandonment, particularly as related to public finance, legislation and economic conditions. A study of the legislation and local policies affecting the disposal or future management of such lands. An analysis of the above in order to suggest legislation and public policy which will result in stable ownership and proper care for permanent productivity of such lands.

STATUS: Work commences March 2, 1932. Working plan in preparation.

RESULTS OF PAST YEAR: See above.

PLANS FOR FISCAL YEAR 1933: To make a general survey through State and County records and through contacting owners and well-informed individuals to get a full and true picture of the present situation, the causes, and the trends. To make more detailed study of tax delinquent property in sample areas representing various types of forest land, public finance, and classes of ownerships. First work will be limited to western Oregon and western Washington; later extended to the east side of these States.

ASSIGNMENT: S. A. Wilson.

PROJECT: Economics - Selective Logging in Douglas Fir

SCOPE: Includes basic time and cost analysis of logging operations with prevailing types of machinery and methods; the application of the findings to selective logging and other improved practices of timber management and the economic significance of the general use of such practice in the Douglas fir region.

STATUS: Collection of field data has been completed. Studies of various types of yarding, swinging, and loading machinery and methods have been made in 13 different logging operations, including data on approximately 40,000 logs, scaling 30,000 M feet B. M. In addition to this, information has been secured on railroad main-line spur construction and transportation costs and the items of cost necessary to show the combined cost of logging from the stump to the mill. The section of the report covering this phase of the study is completed in rough draft, and the second section of the report dealing with application to timber management is well under way. The completion of final draft of the first two sections will be concluded within two months. The preparation of the third section dealing with the broader economic phases will require considerable further time.

RESULTS OF THE PAST YEAR: The results of the study indicate a large spread in conversion values of timber within typical timber properties in this region. It seems most certain that a large percentage of timber in the average stand including smaller-sized trees and inferior species when cut for the general market is converted at an immediate loss as well as resulting in destruction of income possibilities within the near future. The study further indicates that certain types and combinations of machinery and methods are now available which give full freedom to logging operators in the selection of trees and stands. This will definitely permit liquidation of the higher values of the properties without interfering with the progressive increase of residual values and their utilization when conditions justify.

PLANS FOR FISCAL YEAR 1933: Following the completion of the final reports it will be desirable to see whether supplementary studies will be necessary covering new equipment which is now in the process of development. This project will require additional time and cost studies in the future and occasional revision of or additions to the report now under preparation in order to keep abreast of the changes constantly occurring within the region.

ASSIGNMENT: Original assignment was Kirkland and Brandstrom. Kirkland has since been transferred to Washington Office. Both have been recently working on the reports which will be continued by Brandstrom at the Experiment Station and Kirkland at Washington.

PROJECT: Products - The Economics of Logging and Milling in Oregon and Washington.

- A. Time and mill scale studies in the Douglas fir region. Formerly Proj. L-260 (R-6) 8. (Continued)
- B. Lumber manufacture in the ponderosa pine region of Oregon. Formerly Proj. L-260 (R-6) 2. (To be closed)
- C. The economics of small sawmill operation in the Douglas fir region. (Newly proposed)
- D. The economics of truck logging in the Douglas fir region.
- E. Selective logging in ponderosa pine. (Newly proposed)

SCOPE: To cover the mechanical and economic phases of the production of logs and lumber within the region.

STATUS: A. A study proposed March 10, 1931. Nothing has been done to date by the Section of Products but four studies conducted by Hessler and Co. in cooperation with West Coast Lumberman's Association as part of selective logging project.

B. Work started in 1927 at sawmill of Mt. Emily Lumber Co. Additional field work was done at the logging camp and sawmill of the Shevlin-Hixon Lumber Co., Bend, Oregon, in 1928. A report "The Effect of Tree Sizes on Western Yellow Pine Lumber Values and Production Costs", based on data acquired at the Shevlin-Hixon operation, was published in "The Timberman".

- C. A newly proposed phase of the project.
- D. A newly proposed phase of the project.
- E. A newly proposed phase of the project.

RESULTS OF THE PAST YEAR:

- A. See above.
- B. A report on the Mt. Emily milling study was completed. A second report combining the log data from the Shevlin-Hixon and Mt. Emily mills will be completed by April, 1932.
- C. Nothing done.
- D. Nothing done.
- E. Nothing done.

PLANS FOR FISCAL YEAR 1933:

- A. Time and mill scale studies to be made in Oregon Douglas fir mills if mills can be found which are cutting nearly normal in respect to grade.
- B. To be closed.
- C. It is proposed to study a number of small sawmills in accordance with a working plan to be drawn up later.
- D. It is proposed to study a number of truck logging operations in accordance with a working plan to be drawn up later.
- E. It is proposed to make basic time and cost analyses of logging operations with prevailing types of machinery and methods; the application of the findings to selective logging and other improved practices of timber management in the ponderosa pine region of Oregon and Washington.

ASSIGNMENT:

- A. H. M. Johnson, E. F. Rapaeger
- C. E. F. Rapaeger, H. M. Johnson.
- D. E. F. Rapaeger.
- E. E. F. Rapaeger in collaboration with Brandstrom if
he is assigned to this region.

PROJECT: Products - The Economics of the Utilization of Pacific Northwest Hardwoods and Incidental Species. Formerly Proj. L-264; utilization of little used species under which were separate projects on western hemlock, Pacific Northwest hardwoods, and white fir.

SCOPE: A complete study of the production and utilization of Pacific Northwest hardwoods and incidental softwood species.

STATUS: Study of red alder completed with the report "Red Alder of the Pacific Northwest" published as a department bulletin (No. 1437). Study of bigleaf maple completed with the report "Utilization of Bigleaf Maple of the Pacific Northwest" now in process of printing as a department bulletin. Considerable work has also been done on a study of Oregon white oak, and some on black cottonwood.

RESULTS OF THE PAST YEAR: Some work was done bringing together available information on Oregon white oak and black cottonwood.

PLANS, FISCAL YEAR 1933: If possible, it is planned as incidental to other work to complete the study on Oregon white oak.

ASSIGNMENT: H. M. Johnson.

PROJECT: Products - The Inventory, Reduction, and Utilization of logging and sawmill waste in Oregon and Washington.

A - A general survey of mill waste in the sawmills of the Douglas fir region. Formerly Proj. L-260 (R-6) 2. (To be closed)

B - Felling and bucking in the Douglas fir region. Formerly Proj. L-260 (R-6) 3. (To be closed).

C - The reduction and utilization of sawmill waste in the Douglas fir region. (Formerly Proj. L-260 (R-6) 6 and Proj. L-260 (R-6) 7.

SCOPE: To inventory the sawmill and logging waste in the region.
To study methods of reducing and utilizing this logging and sawmilling waste. To suggest new outlets for which unavoidable waste may be suited.

STATUS: A. Completed by publication of report.
B. To be completed by April, 1932.
C. A newly proposed phase of the project.
Nothing done as originally planned.

RESULTS OF THE PAST YEAR:

A. Report completed and published in The Timberman, Vol. XXXII, Nos. 9-12, 1931, under the title "The Present Utilization of Sawmill 'Waste' in the Douglas Fir Region".

B. The time study phase was completed and a report prepared and published in the December issue of the West Coast Lumberman. Field work on the breakage phase commenced in July, 1931, and ended in September. The report will be completed by April, 1932.

C. A new alignment of the projects suggested Feb. 25, 1931. Nothing has been done to date.

PLANS FOR FISCAL YEAR 1933:

A. To be closed.
B. To be closed.
C. Individual investigation of the different phases as time and opportunity present themselves.

ASSIGNMENT: None needed.

PROJECT: Products - The statistical study of forest products, their prices, production and use in Oregon and Washington. The cutting and depletion phase and the requirements phase of the forest survey, which will be handled largely by the Section of Forest Products, come under this project in reality, but are covered by the project sheet for the Forest Survey.

A. A study of the industries producing minor forest products in Oregon and Washington. Formerly RE Prices (continuous).

B. Annual lumber, lath, shingle and log census. Formerly RE Census - Production (continuous).

SCOPE: A. Project includes the gathering of statistical data as related to the production of poles, piles, fence posts, forest fuelwood, forest pulpwood, hewed ties and timbers, round and split mine timbers, veneer blocks, excelsior bolts, and cascara bark. It also includes a study of production methods and costs, and the relation of the various industries to forestry.

B. General production statistics for Oregon and Washington.

STATUS: A. Work was begun on this project in January, 1931. The field work was completed and report prepared and submitted to the Forester, October 31, 1931.

B. Project started a number of years ago with work as related to past years completed and 1931 in progress.

RESULTS OF PAST YEAR:

A. The study as related to 1930 has been completed.

B. In cooperation with Census Bureau collected lumber, lath, and shingle statistics for 1930.

PLANS FOR FISCAL YEAR 1933:

A. Nothing definite planned. Possibly some work will be done as related to 1932 production for the requirements phase of the forest resource survey.

B. Lumber, lath, and shingle statistics to be gathered for 1932.

ASSIGNMENT:

A. H. M. Johnson.

B. H. M. Johnson.

PROJECT: Products - Special studies in fields not covered by other existing project groups.

- A. Air-seasoning of wood. Formerly Proj. L-257.
- B. A study of present dry kiln practice in Douglas fir mills of Oregon and Washington.

SCOPE: As wide as these special projects may require. At present the seasoning of lumber in the region.

STATUS: A. Completed by publication as reported in the project sheets for last year.
B. A newly proposed project.

RESULTS OF PAST YEAR:

- A. Nothing done.
- B. Nothing done.

PLANS FOR FISCAL YEAR 1933:

- A. To be closed.
- B. It is proposed to study drying in a wide variety of kilns to include various types and degrees of efficiency, in accordance with a working plan to be drawn up later.

ASSIGNMENT:

- B. J. E. Lodewick, H. M. Johnson.

PROJECT: Forest Insurance Study - Forest Fire Cooperation.

SCOPE: Ultimately a nation-wide inquiry authorized by the Clark-McNary law into the possibilities of practical fire insurance facilities for the owners of forest properties. Up to the present an intensive study of the mature and immature forest of the Douglas fir region.

An important forest economic research project, the findings of which will be essential to the determination of soundness of forest properties as private investments. The study thus plays an integral part in the development of national forest policy, since it bears heavily on the whole question of whether general private ownership can be made safe and attractive to private capital.

STATUS: Results that are definitely encouraging as to the possibilities of forest fire insurance have been obtained through study of the recorded data checked by careful examination of losses in the field. How encouraging these results are is indicated by the determination that during the decade preceding 1930, the rate of loss in merchantable timber in the whole region was not over $3\frac{1}{2}$ cents per \$100 of value per annum.

The relative losses under varying physical conditions and as affected by varying causative agencies have been determined, the results now awaiting more complete figures from the forest survey so that relative hazards can be determined by integration.

An intensive study of climatic variation has been completed and the determination of the relative values of the protective effort in the various districts is under way.

An inquiry into forest valuation for fire insurance purposes has been made and the material presented in approximately the form it will have in the final report.

RESULTS OF THE PAST YEAR: Practically all of the accomplishments cited under "Status" have been made during the past year. The previous year was occupied mainly by the development of methodology and working plans, except for a portion devoted to field study of burned areas.

PLANS FOR FISCAL YEAR 1933: Final completion of the study in the Douglas fir region if sufficient data can be secured from the Forest Survey. Study will be made in the near future into the possibilities of getting sufficient data prior to final completion of the Survey.

If the study is completed in the fir region prior to the end of the year, or if it has to be suspended while awaiting production of essential figures from the Survey, it will probably be extended to the ponderosa pine region of eastern Oregon and Washington.

ASSIGNMENT: H. B. Shepard.

RS
Pi

Continued

PROJECT: Forest Entomology - Barkbeetle Control.

SCOPE: The determination of the effectiveness of present methods of controlling the western pine beetle; the most favorable seasons for such work; and the length of time the results are effective.

STATUS: The project has been under way since 1921 when the first large scale control work was undertaken in southern Oregon and has continued during the progress of subsequent work up to the present time.

RESULTS OF THE PAST YEAR: It was expected that this project could be brought to a close during the present fiscal year with the summarizing of ten years of records. Unfortunately, field assistance could not be obtained during the past season to finish the cruising work and as a consequence the final analysis will have to be postponed for another year, at least.

PLANS, FISCAL YEAR 1933: If field assistants can be appointed this coming year, the plot surveys will be completed during the summer of 1932, and a final analysis made.

ASSIGNMENT: Keen, Buckhorn and field assistants.

RS
Pi

Continued

PROJECT: Forest Entomology - Coniferous Defoliators of the Pacific Northwest.

SCOPE: Defoliating insects rank with the barkbeetles as potential forest destroyers in the Pacific Northwest. The study of their life histories and habits is very essential as a basis for working out possible control methods.

STATUS: An outbreak of the hemlock looper in Pacific County, Washington, gave an opportunity to secure some very worthwhile data on this destructive enemy of western hemlock. Other defoliators will be studied as opportunity permits.

RESULTS OF THE PAST YEAR: The study of the hemlock looper outbreak gave information on its seasonal history, its feeding habits, the character of stands most susceptible to injury and the per cent of defoliation which causes death to the trees.

Dusting the infested areas with calcium arsenate proved to be effective wherever a uniform and fairly heavy dosage was applied. On the sample plots caterpillar mortality up to 88 per cent was secured with an average mortality of about 45 per cent on all plots. The cost of dusting, which will not exceed 15 cents per thousand board feet or about \$2.75 an acre, was considered to be very reasonable.

PLANS FOR FISCAL YEAR 1933: A study of how natural control factors become operative in a hemlock looper outbreak will be continued during the next fiscal year, with particular reference to parasites, predators and adverse weather conditions.

ASSIGNMENT: Keen.

RS
Pi

Closed

PROJECT: Forest Entomology - Relation of Temperature and Moisture to Development of Barkbeetle Broods.

SCOPE: To determine the effect of temperature and moisture in limiting the development of the western pine beetle, engraver beetle Buprestids and Cerambycids; and the optimum conditions for brood development.

STATUS: This study was carried on under field conditions in southern Oregon for two summers and then transferred for one winter to laboratory conditions at Berkeley, California. Brood development studies, particularly on the western pine beetle, have added considerably to a knowledge of this insect. The study has been completed and a final report prepared.

RESULTS OF THE PAST YEAR: Laboratory studies showed that brood development of the western pine beetle begins at about 50 degrees F.; that its rate increases with the temperature to about 85 degrees, and that continued temperatures of 95 degrees and over were fatal to all stages. Slash and blocks, because of excessive cambium moisture and changes in food material, offer poor breeding grounds for this insect. A definite number of hour-degrees of effective temperatures are necessary for the development of a specific brood stage of the western pine beetle. A thermograph record would probably be very useful in determining the time of emergence of overwintering broods in any particular area.

PLANS FOR 1933: No further work on this project is contemplated for 1933 except publication of the results of the study.

ASSIGNMENT: J. A. Beal.

PROJECT: Forest Entomology - The Fundamental Causes of Barkbeetle Epidemics and Relationship of Climatic and Silvicultural Factors.

SCOPE: To determine the fundamental causes of barkbeetle outbreaks, particularly the western pine beetle in ponderosa pine stands, east of the Cascades to see if there is a distinct cycle or periodicity in these outbreaks which is linked to climatic cycles and hence can be forecasted; or if outbreaks are related to silvicultural conditions within the stands, and can be avoided through the modification of silvicultural practices.

STATUS: The trend of barkbeetle outbreaks has been recorded in southern Oregon since 1913 and continuous plot records in Klamath and Lake Counties have been kept since 1921. This basic record of fluctuations in barkbeetle activity will have to be continued for many more years before final conclusions can be reached as to trends and correlations with causative factors.

RESULTS OF THE PAST YEAR: In order to broaden the scope of the study and include other climatic zones and forest conditions, 14 new plots were established in eastern Oregon and Washington through cooperation of the Forest Service and assistance of the Ranger force. This work also served to give the rangers a knowledge of the important insects in their districts and methods of detecting insect activity and damage. The work received hearty support on the part of the field force of the Forest Service and their assistance is greatly appreciated. Curtailment of field assistant appointments materially affected the work on the long time plots in southern Oregon.

PLANS FOR FISCAL YEAR, 1933: It is hoped that temporary help can be secured this coming year to catch up on the plot cruising work which had to be slighted during the past season. Moreover, a complete stand inventory at this time would be very desirable in order to determine the net loss or gain on plots cruised during the past ten years as a basis for estimates on forest drain. This project is one of the most important carried by this station and rates a high degree of priority.

ASSIGNMENT: Keen, Beal, Buckhorn, field assistants and Forest officers.

PROJECT: Forest Entomology - Insect Enemies of Sitka Spruce.

SCOPE: To determine the cause of the dying of Sitka spruce along the Oregon and Washington Coast; the extent to which insects are responsible for this condition; and to secure information on life history, habits and possibility of controlling any important insect enemies.

STATUS: This project has been started in a small way through summarizing information developed in the past and in collecting and studying insects found attacking this tree. It is hoped that more emphasis can be placed on this project in the future.

RESULTS OF THE PAST YEAR: The green spruce aphid was found to be a primary cause of the death of Sitka spruce, particularly along the tidelands and coastal areas. Several barkbeetles are apparently important enemies of mature trees. An unidentified bud moth and the Sitka spruce weevil were found killing terminals of reproduction.

PLANS FOR FISCAL YEAR 1933: An intensive study of the green spruce aphid is contemplated for the coming year, provided time is available. This insect has an alternate host which is as yet unknown and many phases of its life history are still a mystery. The possibility of control, especially on valuable trees needs to be studied.

ASSIGNMENT: Beal and Keen.

PROJECT: Forest Entomology - The Effect of Large Logging Operation on Beetle Infestation.

SCOPE: To determine what effect a large logging operation has in removing destructive barkbeetles from the vicinity of the operation or through attraction of slash on concentrating them around it and thus changing the trend of barkbeetle epidemics.

STATUS: One full year of detailed records have been kept on the Weyerhaeuser Timber Co.'s operation near Klamath Falls and the effect of the operation in removing beetles from the woods rather accurately determined. The general area will be kept under observation for a few more years to determine trends of infestation in this vicinity.

RESULTS OF THE PAST YEAR: Ponderosa pine logs which are found to be very attractive to western pine beetle, tend to absorb attacking beetles within four days after cutting. If these logs are removed within two or three weeks after cutting, the study showed that for every 6 M ft. of timber taken out of the woods, enough beetles were removed to have been capable of attacking and killing one medium sized tree (24" d.b.h. and 90 ft. high). The attractive influence of newly felled logs is more or less local and does not appear to attract beetles more than one half or three fourths of a mile.

PLANS FOR FISCAL YEAR, 1933: The survey of check plots on and near the logging operation will be continued to determine the trend of barkbeetle activity in the vicinity.

ASSIGNMENT: J. A. Beal, Buckhorn and field assistants.

RS
Pi

Closed

PROJECT: Forest Entomology - Insects and Slash Disposal Methods in Ponderosa Pine.

SCOPE: To determine the effect of various methods of slash disposal practiced in ponderosa pine cuttings, upon insect population and subsequent insect damage to reproduction, reserve stand and seed trees.

STATUS: This study has been carried on intensively in the Weyerhaeuser Timber Co.'s operation near Klamath Falls, Oregon, for the past two and a half years and during the past season was extended to other operations throughout eastern Oregon and Washington. The study has now been completed and the final report prepared.

RESULTS OF THE PAST YEAR: The results of the past year confirmed the conclusions of the earlier work and also showed that conclusions reached from the work at Klamath Falls were generally applicable throughout the ponderosa pine areas of this region. The only insect of importance found breeding in slash is the Oregon Engraver beetle. Where slash is exposed to the sun, conditions are unfavorable for the multiplication of these beetles but when the slash is shaded either in piles or in tops thrown into thickets, six times as many beetles are produced and these become a factor in the killing of reproduction and poles. The slash disposal method recommended by Munger in Tech. Bull. -- 259 is also the most desirable practice from the entomological standpoint.

PLANS FOR 1933: No further work on this project is contemplated for 1933 except the publication in some form or other, of the results of the study.

ASSIGNMENT: J. A. Beal.

RS
Pd

Continued

PROJECT: Forest Pathology - General Forest Pathology.

SCOPE: Collection of information regarding distribution, economic importance, and habits of forest tree diseases in the Pacific Northwest and of exotic diseases potentially dangerous to trees of this region; provision of advice on the prevention and control of diseases of trees, and decay and other defects of forest products.

STATUS: This project has constituted a function of the office since the inception of the latter. Permanent records are kept of pathological observations generally and are supplemented by a comprehensive collection of the various diseases and decays found. The importance of keeping in touch with the disease situation for the more valuable timber species of the district locally and generally is obvious in connection with disease prevention and forest protection. Pathological reconnaissance under this project is carried out so far as possible in connection with work on other projects.

RESULTS DURING 1931: Thirty-two inquiries concerning diseases of forest trees of the district, usually accompanied by specimens, were answered during 1931. No serious disease outbreak or foreign diseases were noted within the region. A large number of native decay-causing, canker-forming, and needle-casting organisms have been added to the herbarium.

PLANS FOR THE FISCAL YEAR 1933: Work to be continued as above.

DATE OF COMPLETION: Permanent.

ASSIGNMENT: All members of the office.

PROJECT: Forest Pathology - Decay of Slash in the Douglas Fir Region.

SCOPE: Determination of the rate of decay of slash in the various forest types of this region, with special reference to its bearing on the problem of slash disposal.

STATUS: This project is cooperative with the Forest Experiment Station (RS, Mb-161, Douglas Fir Slash Disposal) and Forest Management. A total of 156 slashings of different ages thru out the regions have been examined during the last four years.

Decay of logging debris, particularly of the smaller material, is rapid in unburned coastal slashings. Ten years after logging, most of the smaller debris (needles, twigs, and branches) is disintegrated, and the logs, with the exception of Douglas fir and western red cedar heartwood, are quite thoroly decayed. A dense cover of perennial growth becomes established soon after logging, shading the slash and generally keeping the decayed wood soggy and fire-resistant thruout the year. Decay is somewhat slower on burned areas. Establishment of vegetative cover is considerably retarded by burning and the proportion of annuals remains high for several years. These annuals not only are less effective in shading the slash and preventing its drying, but thru the accumulation of their dead remains cause an actual increase in fire hazard.

In the Douglas fir type proper between the Cascade and Coast ranges, decay is somewhat slower than in the coastal section. Ground cover develops less rapidly, has a large proportion of annuals even on unburned areas, and in most cases remains comparatively sparse for many years. These factors, together with the lower humidity prevailing during the summer, cause logging debris in this region to become a higher fire hazard and to remain high for several years longer than is the case along the coast.

RESULTS DURING 1931: Field work on this project was completed during 1931. Additional study in the coastal region verified most of the conclusions previously drawn.

PLANS FOR FISCAL YEAR 1933: Preparation of report.

DATE OF COMPLETION: Indefinite.

ASSIGNMENT: H. G. Lachmund and T. W. Childs.

PROJECT: Forest Pathology - Decay of Ponderosa Pine Slash .

SCOPE: Determination of the relationship between the rate of decay of slash and the various methods of slash disposal in the ponderosa pine type.

STATUS: This is a cooperative project with the Pacific Northwest Forest Experiment Station (M-Ponderosa pine*). Pathological phases of the Station project are handled by this office, our first work beginning in 1926. Studies were conducted in eastern Oregon.

Piled slash decays very slowly, pieces in the interior of piles twelve to thirteen years old being almost as hard and bright as when cut. Fire-scorched slash also decays slowly. Slash, if left as it fell when the trees were cut, is badly decayed in eight to ten years, primarily by western red rot. This decay becomes established in the bulkier pieces and extends out into the branches. Lopping of branches prevents the establishment of this fungus in the latter and greatly retards decay. Small branches, twigs, and needles decay very slowly.

RESULTS DURING 1931: Results of the studies have been summarized by T. T. Munger and R. H. Westveld of the Experiment Station in U. S. D. A. Tech Bul. No. 259, entitled "Slash disposal in the western yellow pine forests of Oregon and Washington.

PLANS FOR FISCAL YEAR 1933: Cooperation with Experiment Station in follow-up of decay in relation to slash disposal on Experiment Station plots.

DATE OF COMPLETION: Indefinite.

ASSIGNMENT: H. G. Lachmund.

*In the Experiment Station report for 1929 this study was under Project RS, Mb-101, Yellow Pine Slash Disposal, and in the 1930 report under RS, Mc-101, Methods of cutting.

PROJECT: Forest Pathology - Deterioration of Windthrown Timber.

SCOPE: Determination of the rate of decay of windthrown timber of the various species in the various forest types*.

STATUS: Results of study of the Olympic blowdown up to and including 1926 are reported by Boyce in "Deterioration of windthrown timber on the Olympic Peninsula, Washington"; USDA Tech. Bul. 104, February 1929. During 1929 detailed measurements similar to those of 1926 were made of Douglas fir, western hemlock, and Sitka spruce. At that time, sapwood of Douglas fir was practically entirely decayed; heartwood was sound with one exception. Decay in western hemlock had progressed to such an extent that even the largest material was beyond possibility of salvage. Decay in Sitka spruce varied from about 75 per cent of the cubic volume in the 30-inch D.B.H. class to about 35 per cent in the 86-inch class. Sapwood of this species was completely decayed and included approximately 2/3 of the total decayed volume.

RESULTS DURING 1931: During the past field season, examinations were made of several areas of blowdown resulting from the severe wind-storm of April 1931. Deterioration of Douglas fir, hemlock, and associated species on the west slope of the Cascades was negligible in 1931. Losses from stain in ponderosa pine on the east slope of the Cascades were most severe in the larger size classes, attaining a maximum of about 60 per cent of the sapwood volume in the most severely stained class. Traces of incipient decay were quite common in this species, and the great bulk of the volume will probably become entirely unmerchantable during 1932.

PLANS FOR FISCAL YEAR 1933: In view of the rapid deterioration to which down ponderosa pine is subject, measurement of material on the two east-side study plots laid out last year appears highly desirable during the coming season. West-side areas will require little or no attention prior to the summer of 1933 or 1934.

DATE OF COMPLETION: Indefinite.

ASSIGNMENT: H. G. Lachmund and assistants.

*In previous years this project has been limited to study of the timber windthrown on the Olympic Peninsula in Washington, January 29, 1921.

PROJECT: Forest Pathology - White Pine Blister Rust.

SCOPE: Accumulation of facts on the behavior of white pine blister rust pertinent to the development of control measures in the West.

STATUS: Work was begun in 1922 and is carried on yearly thruout the range of the rust in the West. It involves repeated observations and the collection of systematic data on the rust's development in numerous permanent and temporary study localities and plots. Subjects under consideration include a large number of phases, among the most important of which are: general epidemiology (i. e., the general spread of the disease and its reaction to western environmental conditions local and general), susceptibility and damage of white and sugar pines, susceptibility of species of Ribes important as associates of these pines and distance of spread and damage from these Ribes to pines.

Main results worked out include: a method of determining the age of infection on western white pine; early history of the rust in the West; the rust's method of spread, and factors influencing this; the susceptibility and capacity to produce the spores which infect the pines of important western Ribes, particularly those within the commercial range of western white pine; general relations of the younger age classes of western white pine in damage from the rust; infection and prospective damage in larger size classes of western white pine; preliminary index (1) to the susceptibility of sugar and white bark pines, (2) to the susceptibility and capacity to produce spores which infect pines of the two important Ribes within the commercial range of sugar pines in California, and (3) to the capacity of prickly and sticky currants, the two main Ribes of the timber-type in commercial western white pine to spread infection to pines, etc.

RESULTS DURING 1931: Field work was concentrated on the study of the capacity of prickly and sticky currants, the two main Ribes of the timber type in commercial western white pine, to spread infection to pines. The main "stream-type" Ribes in the commercial pine area are so susceptible and productive of pine-infecting spores, and occur in such dense concentrations along the streams that it is expected they will spread damaging infection to pines over distances of a mile. The two timber-type Ribes are relatively resistant and generally much more scattered. Preliminary indications were that spread from them would be relatively light. Present indications, however, are that these Ribes have a considerably greater capacity to spread infection to pines than had been anticipated. Consequently, control which was being centered in the eradication of Ribes in the stream type, will have to be speeded up and applied to all of the commercial white pine area.

Susceptibility tests of the two main Ribes associates of sugar pine in California, being carried out in British Columbia, were continued. Results of the tests in 1931 were practically the same as those secured in 1930, and show Grossularia roezlii to be very high and Ribes nevadense to be high in susceptibility. The former was so heavily infected that practically all infected leaves fell from the plants before telia could be produced. R. nevadense produced telia plentifully and did not lose leaves nearly so readily by action of the rust.

Further results in susceptibility tests of sugar pine being carried out in British Columbia have substantiated previous indications that this pine is somewhat more susceptible than western white pine. For the susceptibility tests of several other white pine species, plots are now well established.

Studies on general spread of the rust showed the year 1931 to be relatively unfavorable for long-distance spread from pines to Ribes. Scouting in Idaho by the Division of Elster Rust Control revealed the rust to be well established on western white pine throughout its commercial range in that State. In Oregon, no further extension of the known southern range of the rust was recorded. The rust has not been found on Ribes or sugar pine in California.

PLANS FOR FISCAL YEAR 1933: Efforts will be concentrated on computation, organization, and analysis of data and publication of results. Field work will be centered on phases of the study absolutely dependent on continuity of observation, primarily the studies of general seasonal conditions and spread of the rust; of spread from the timber-type Ribes to pines; and tests of the susceptibility of sugar pine and its main Ribes associates.

DATE OF COMPLETION: Indefinite.

ASSIGNMENT: H. G. Lachmund, J. L. Mielke, and assistants.

PROJECT: Forest Pathology - Nursery Disease Control at Wind River Nursery.

SCOPE: Determination of the best methods of control of damping-off and other seedling diseases at the Wind River Nursery.

STATUS: Experiments in controlling damping-off were started by Mr. Kummel in the fall of 1928. These experiments, together with additional ones of a more intensive nature, were carried on in 1929 under the technical supervision of the Division of Forest Pathology. Attention was given primarily to Douglas fir, since this was the species in which heaviest losses had occurred. Experimental seed beds were treated with various chemicals at two or three different concentrations. Sulfuric acid at the rates of 3/16 and 1/4 ounce per square foot, and aluminum sulfate at the rates of 1/2 and 3/4 ounce per square foot gave the best results. A high degree of control, both of germination failure and of subsequent damping-off, was secured with each. These chemicals also gave good weed control and stimulated seedling growth. Zinc chloride was second only to sulfuric acid in control of damping-off, but caused severe chemical injury. Other treatments were relatively ineffective.

Under Mr. Kummel's supervision, additional experiments were made in 1930 to check the effectiveness of sulfuric acid, aluminum sulfate, and zinc chloride. Sulfuric acid at rates of from 3/16 to 6/16 ounce per square foot and aluminum sulfate at rates of 3/4 and 1 ounce per square foot gave good control of damping-off, especially with the stronger solution. Zinc chloride at rates of from 1/16 to 3/16 ounce per square foot gave somewhat less control of damping-off and was far less effective in controlling weed growth. No definite chemical injury was found in any of the plots.

RESULTS DURING 1931: Practical application of the 1929 and 1930 results by the nursery personnel revealed that extensive use of sulfuric acid at the rate of 1/4 ounce per square foot gave good results on all except fall-sown, high altitude Douglas fir beds.

PLANS FOR FISCAL YEAR 1933: No work scheduled by this office.

DATE OF COMPLETION: Indefinite.

ASSIGNMENT: Will be carried forward by Messrs. Kummel and Will; this office to assist technically as needed. H. G. Lachmund.